

Watersheds and Stormwater Management at Schools



DEPARTMENT OF

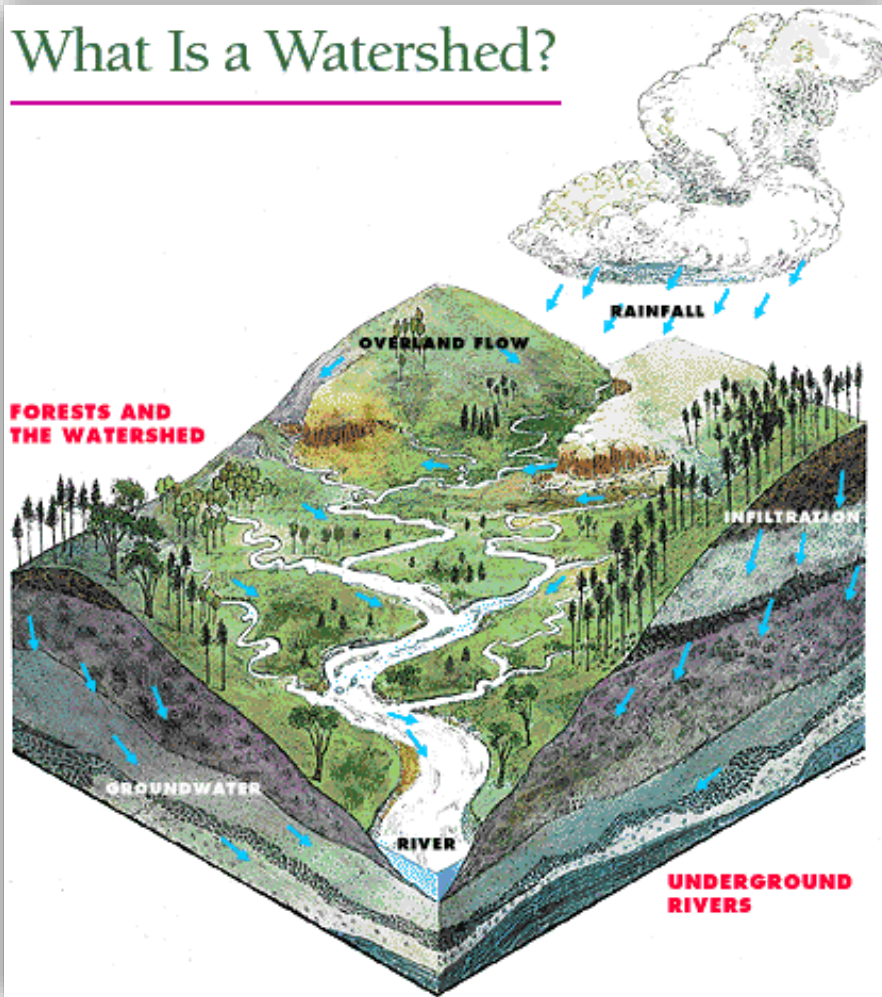
**ENVIRONMENTAL
PROTECTION**

MONTGOMERY COUNTY • MARYLAND

Working together for a cleaner, greener
economically vibrant community

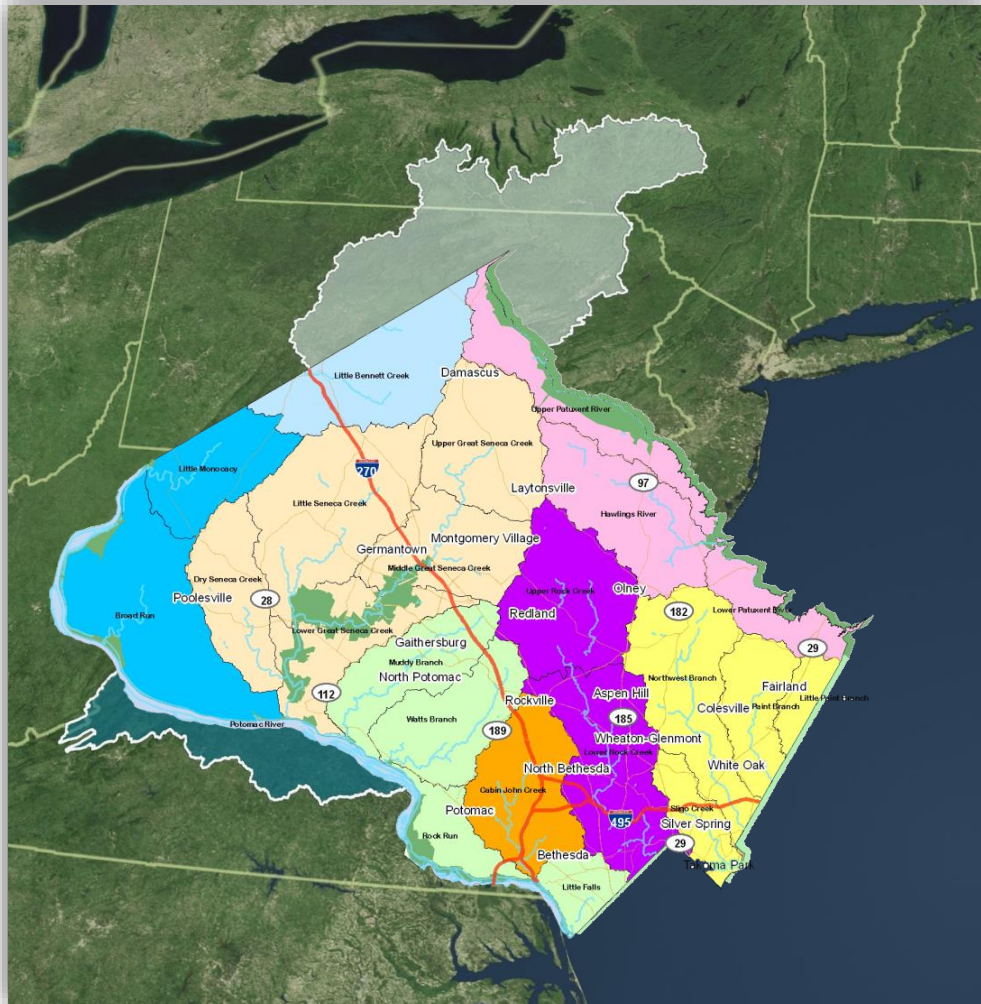
Watersheds 101

What Is a Watershed?



- A **watershed** is the area of land where all of the water that is under it or drains off of it goes into the same place.
- Different scales of watersheds
 - Chesapeake Bay
 - Potomac River
 - Local Creeks and Rivers

What watersheds are we in?



- Chesapeake Bay
- Potomac/Patuxent River
- There are eight small watersheds within the county...
 - Our school is in the _____ watershed and in _____ condition.

How have we changed our watersheds?

Norbeck Road 2015



Central Park and Manhattan Cityscape

What happens to the rain in

Central Park?

What happens to the rain in

Manhattan?

Which is better for our
environment?



Development changes land hydrology

How development can increase runoff

According to a study released by Purdue University, increased development can make the flooding in nearby areas more severe. The more developed an area, the greater the amount of impervious surfaces, like asphalt and concrete. Water can not penetrate these surfaces, so less of the water is absorbed into the ground. It instead becomes runoff, traveling quickly through drains and ditches toward nearby waterways.

As the amount of impervious surfaces grows in an area, runoff increases in intensity

↑ Evapotranspiration:

When water evaporates or is transpired through plants.

→ Runoff:

Water that flows across the ground surface instead of infiltrating the ground.

↓ Ground infiltration:

The ground acts as a sponge, absorbing water then slowly releasing it over time.



Source: Purdue University, Illinois-Indiana Sea Grant College Program

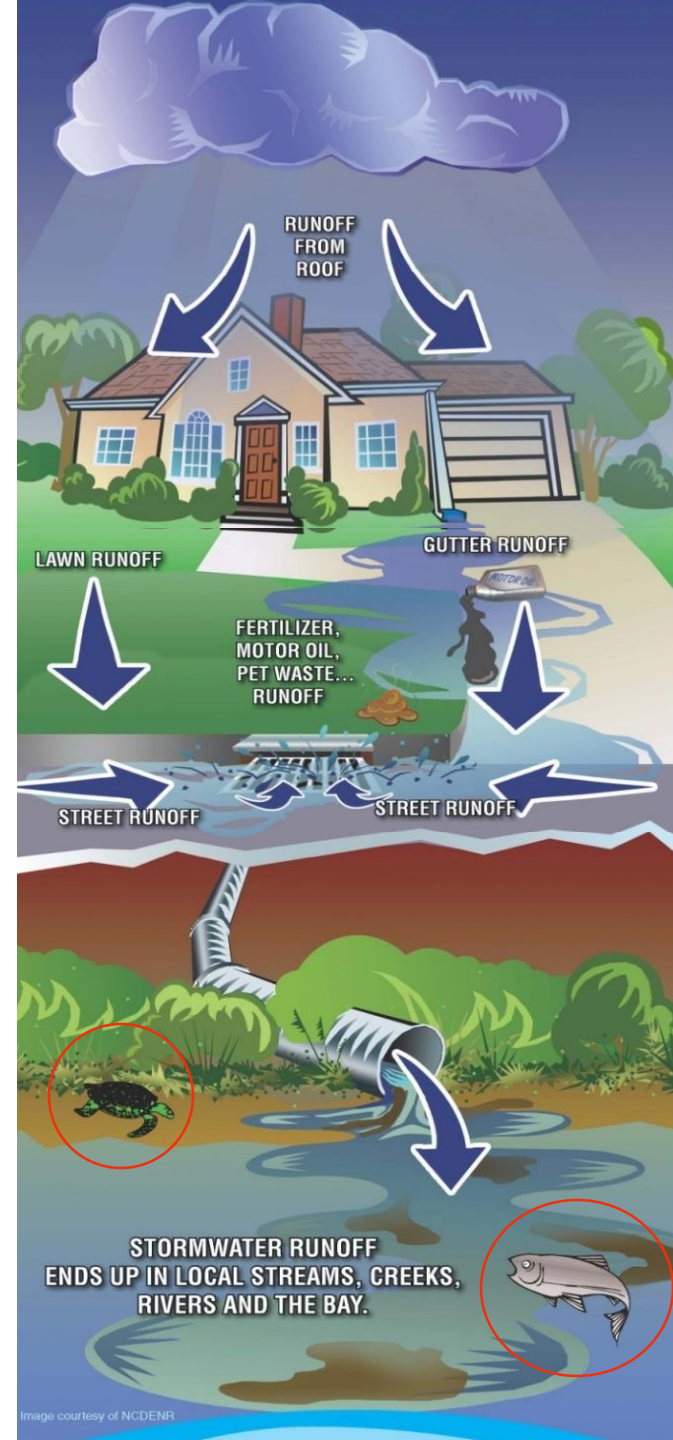
Chris Johnson / The Star

Impacts from Impervious Surfaces: Increased Water Volume and Velocity!



What is Stormwater?

Stormwater is rain that runs off hard surfaces and carries pollution to our streams.



What is in stormwater runoff?



Where do the pollutants go?

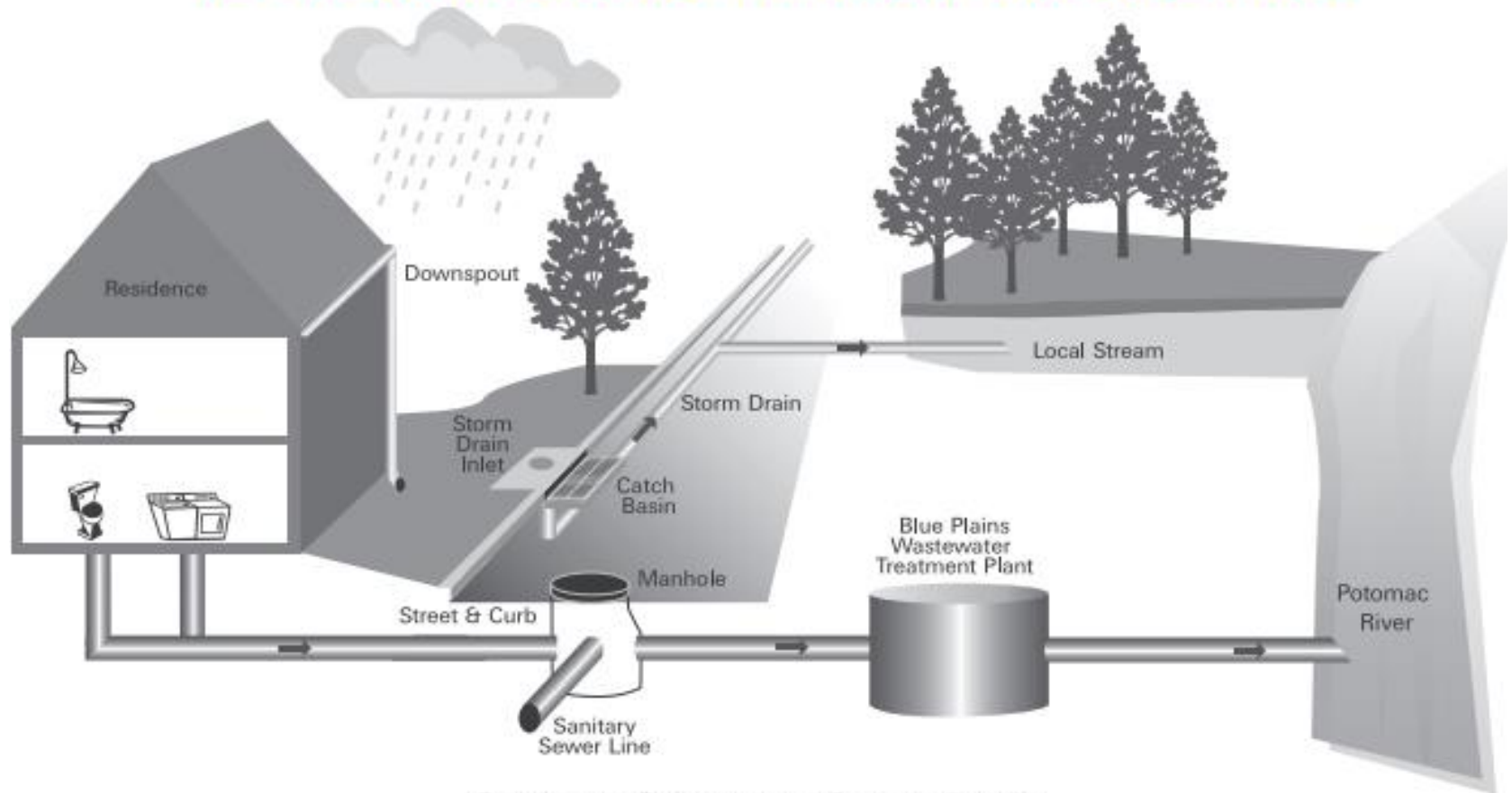


**Where do we get
our drinking water?**

Potomac River

Does stormwater get treated?

Are the contents of storm drains filtered or treated?



**Sanitary Sewer vs. Storm Drain
Do You Know the Difference?**

City of Rockville

What is Stormwater Management?



- Stormwater Management means using above or belowground structures to soak in, slow or store stormwater.
- The structures remove pollutants from the stormwater before it gets to streams.

What does DEP do to help?



Install New Features



Maintenance & Repair



Storm Drain Art



GreenFest

What else does DEP do to help?



Stream/Creek Restorations



Stream Monitoring



Stream Cleanups



RainScapes

Stormwater Management in the Watershed

The Story of Stormwater

THE PROBLEM

Stormwater is rain that runs off hard surfaces & carries pollution to our streams.

Excess fertilizers & pesticides from lawns end up in our streams.

Heavy metals, oil & trash from parking lots & roads pollute our streams.

Roofs & paved surfaces don't allow water to soak into the ground.

Large volumes of stormwater erode stream banks, causing trees to fall & die.

Pet waste has harmful bacteria that affects stream wildlife.

DID YOU KNOW?

Everything that goes down our storm drains ends up in local streams!

THE SOLUTION

Montgomery County and its residents build & maintain stormwater management practices to protect streams and the Chesapeake Bay.

Stormwater ponds & sand filters slow the flow of water & remove pollutants.

Rain gardens (also called bioretentions) absorb water & filter pollutants.

Green roofs & permeable pavement slow the flow of water.

Tree planting & stream restoration protect stream banks from erosion.

Pick up & dispose of pet waste in the trash.

DID YOU KNOW?

Most of our drinking water comes from the Potomac & Patuxent Rivers!

Support
stormwater management
in your neighborhood
montgomerycountymd.gov/water



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Maria Rabinsky

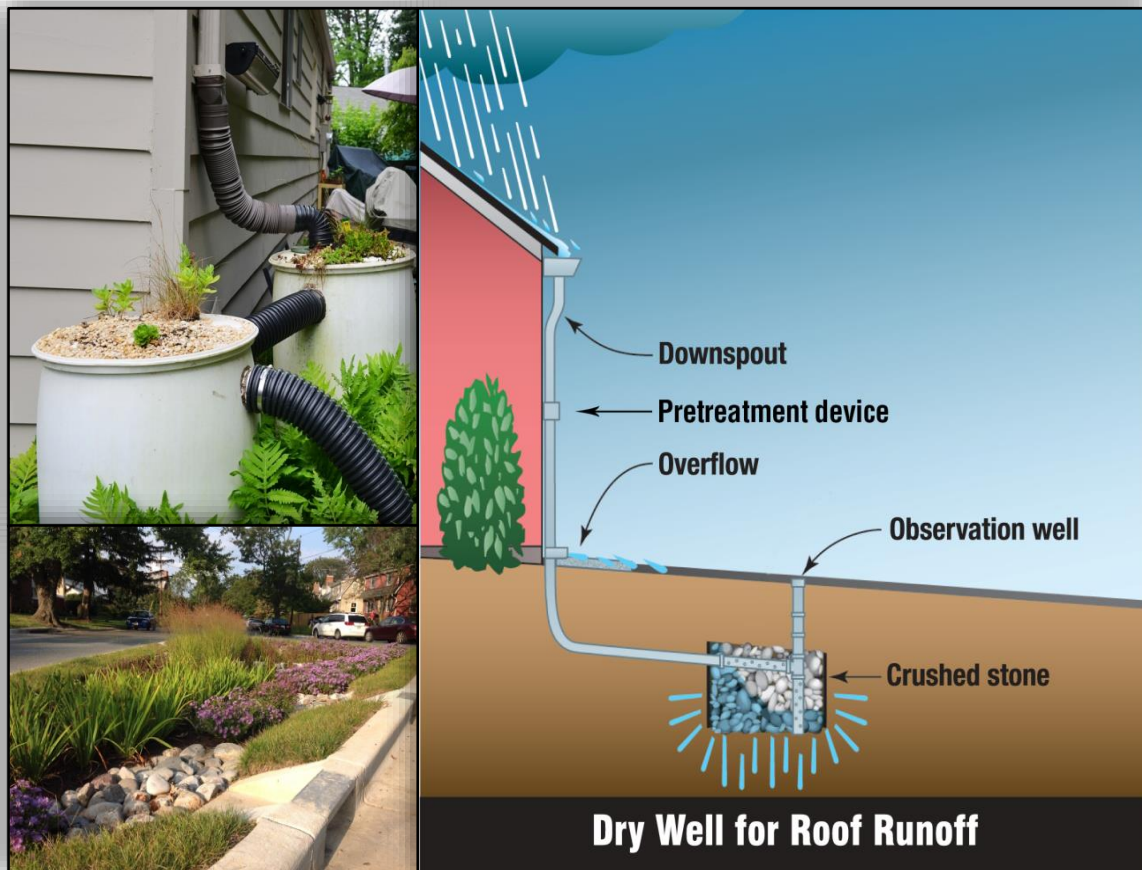
Stormwater Management: Changing Techniques



The old way:

- Pipe to ponds
- Settle
- Send away

Stormwater Management: Changing Techniques

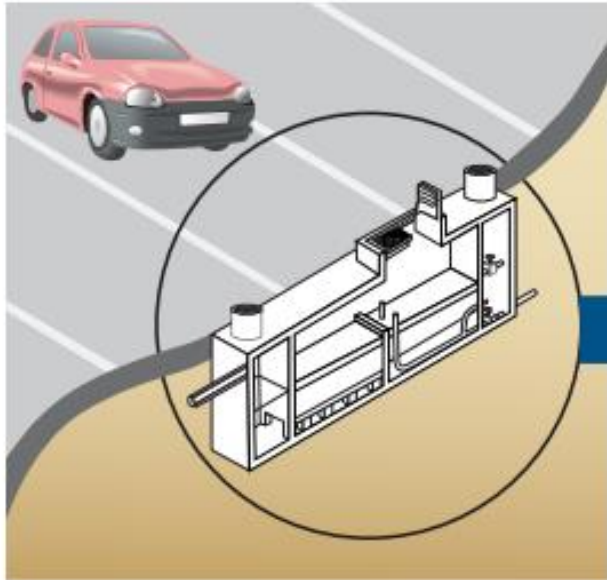


The new way:

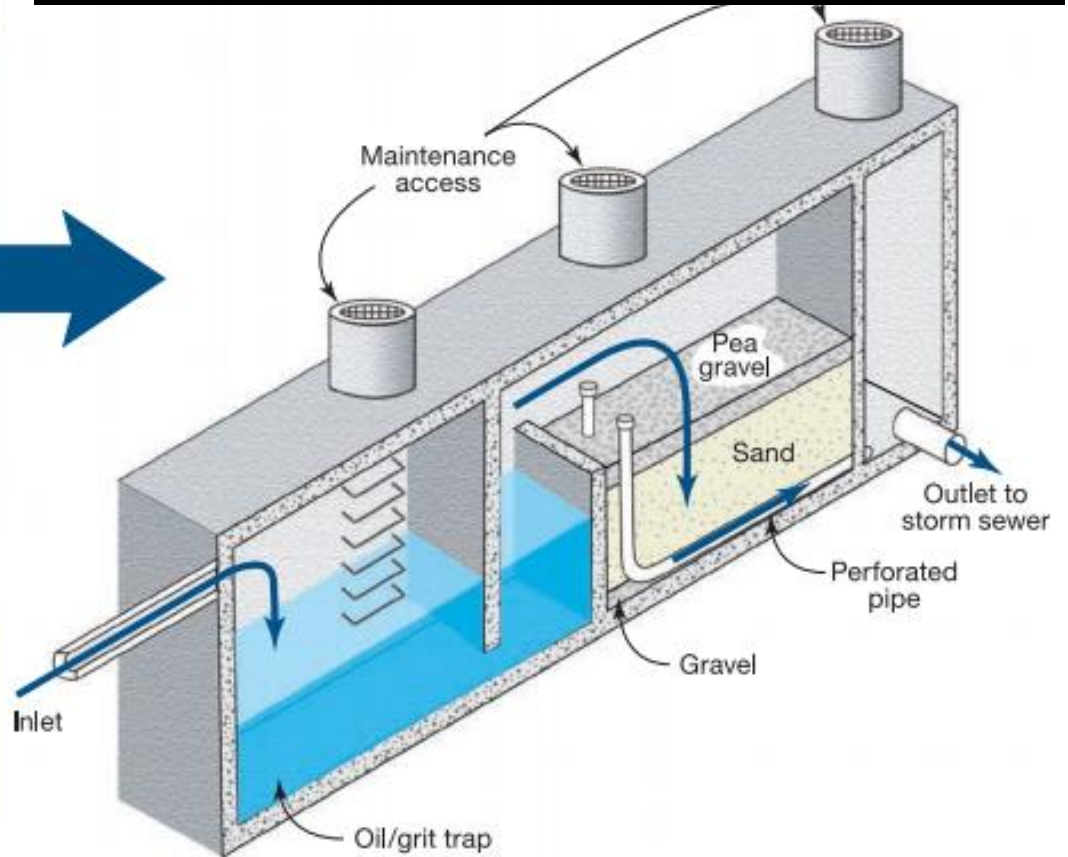
- ◉ Keep onsite
- ◉ Filter
- ◉ Recharge

This is
Environmental Site
Design (ESD)

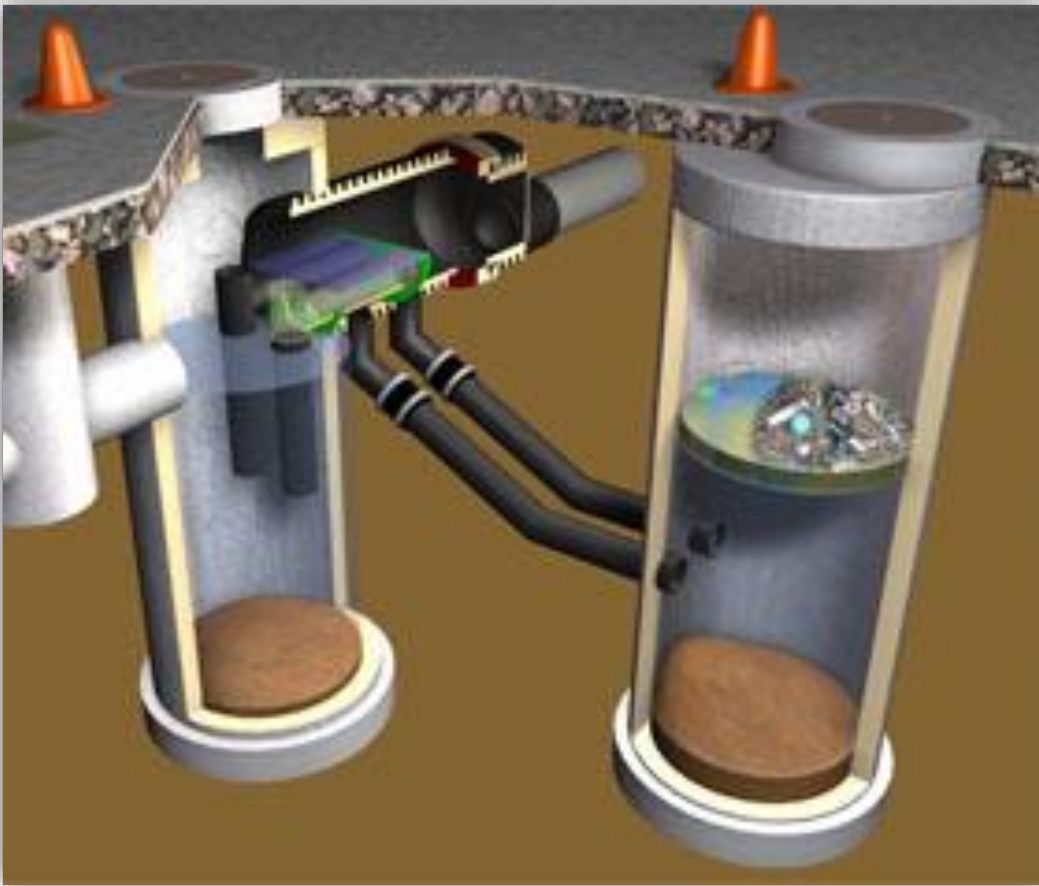
SWM Tools at Schools



Underground Sand Filter

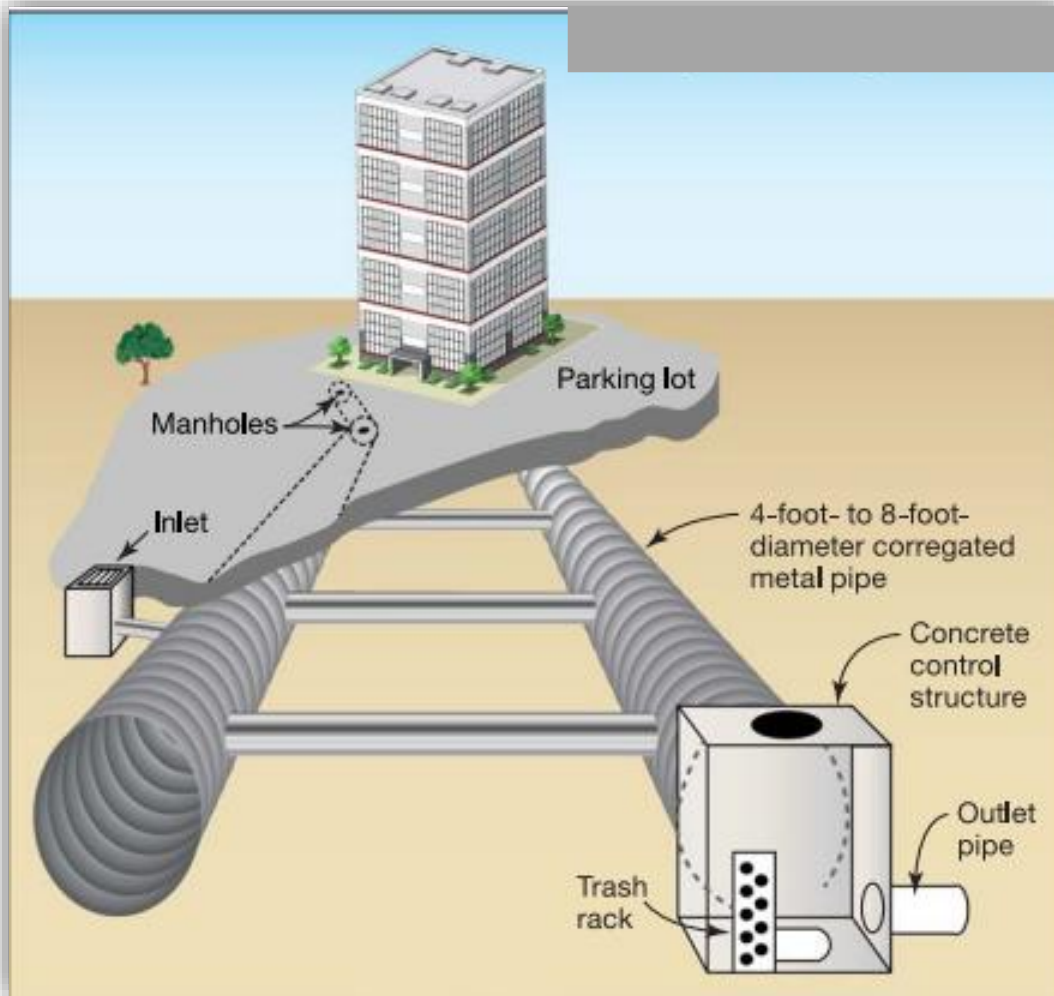


SWM Tools at Schools

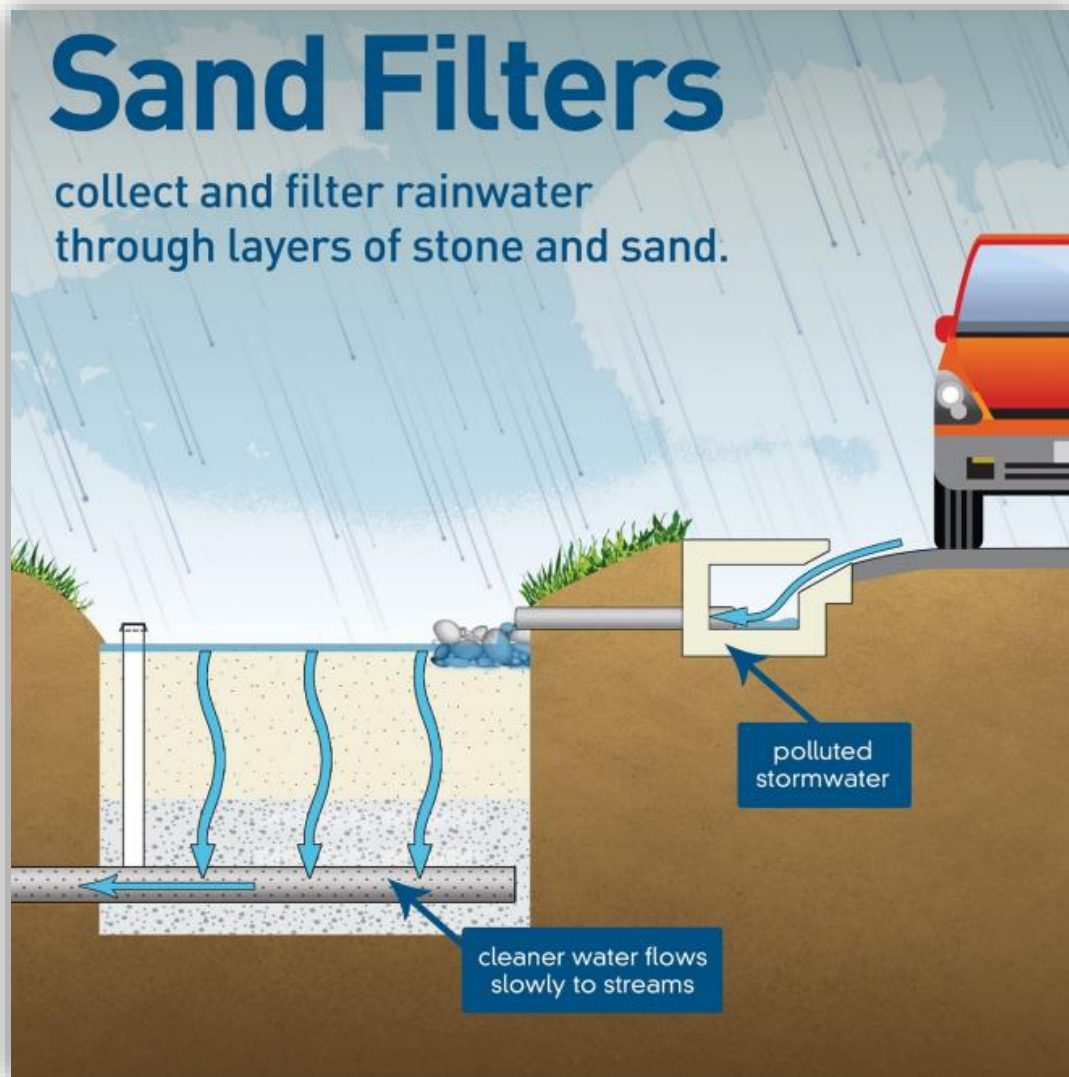


Hydrodynamic
Splitter

SWM Tools at Schools



SWM Tools at Schools



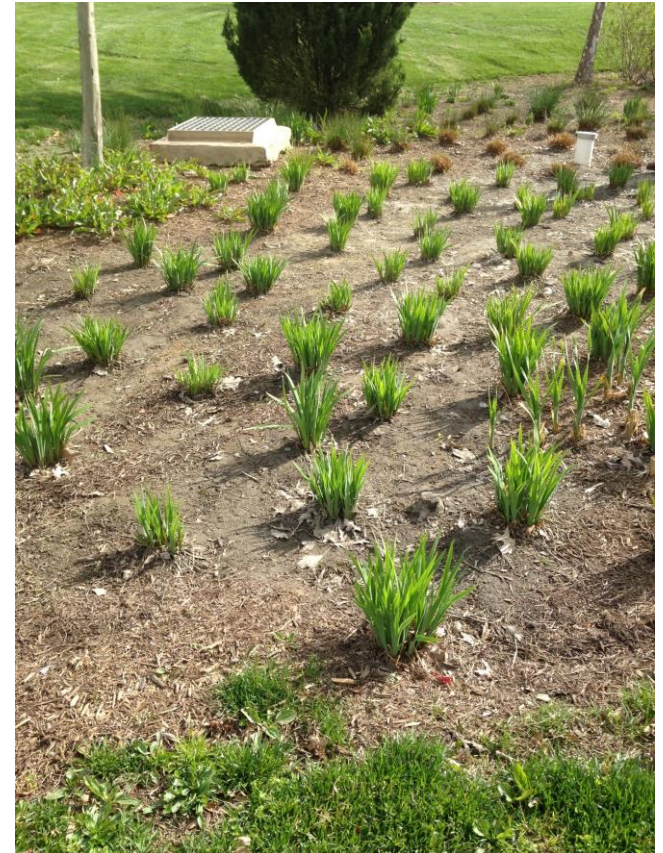
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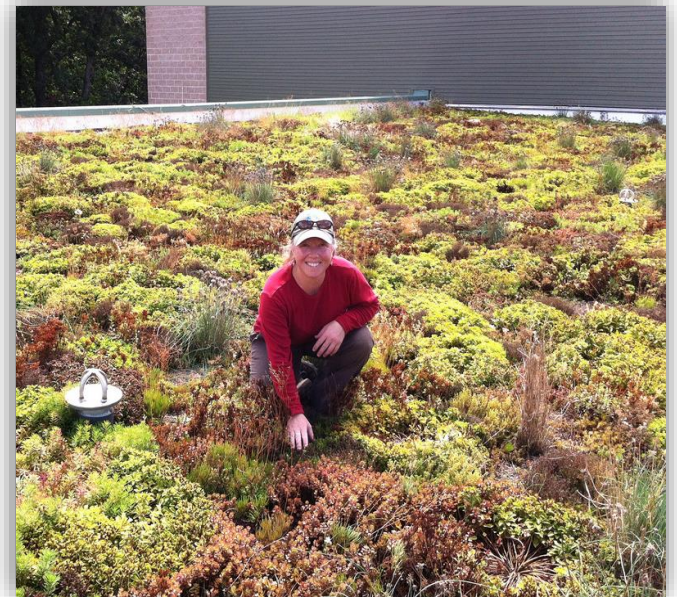
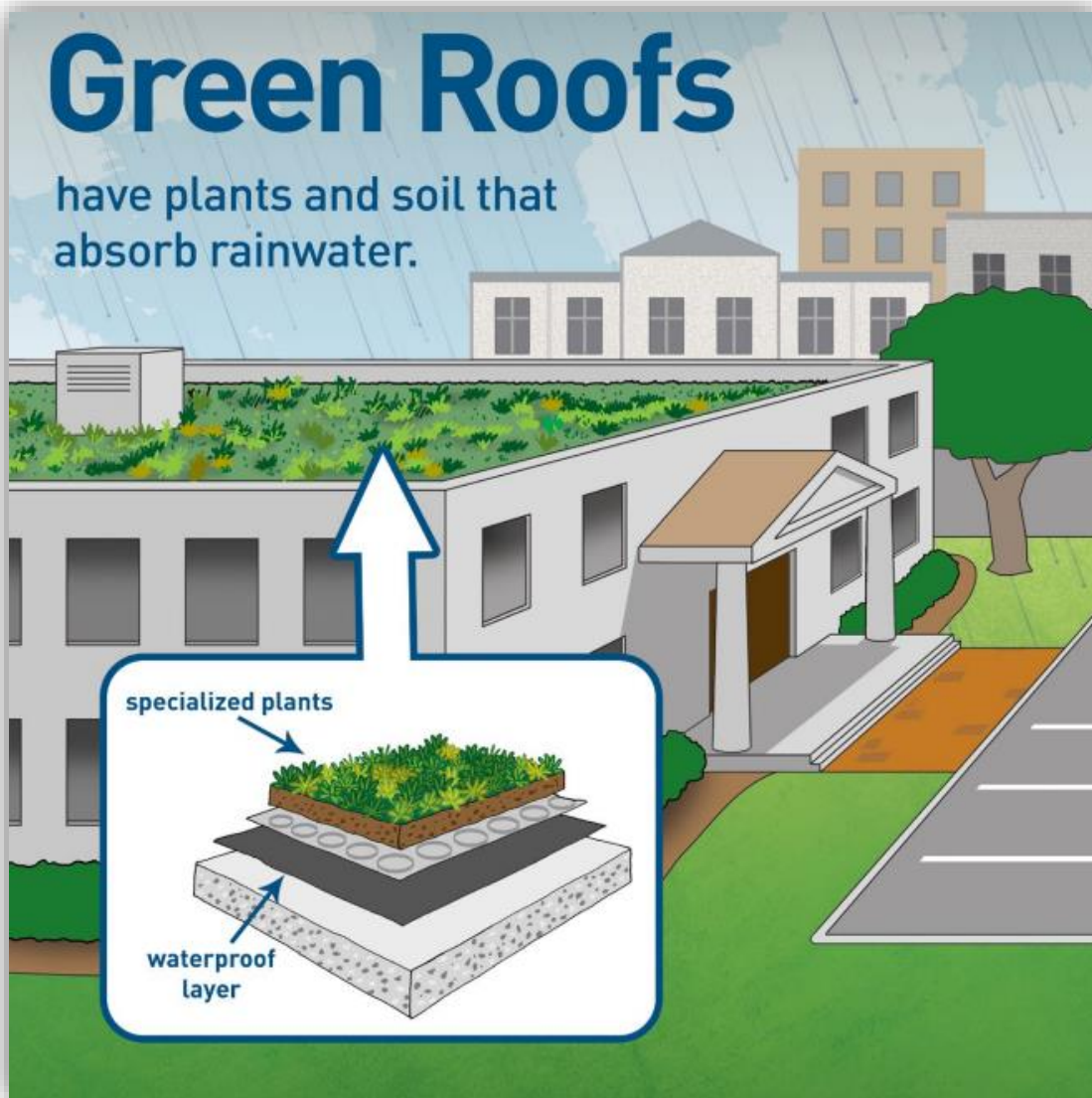
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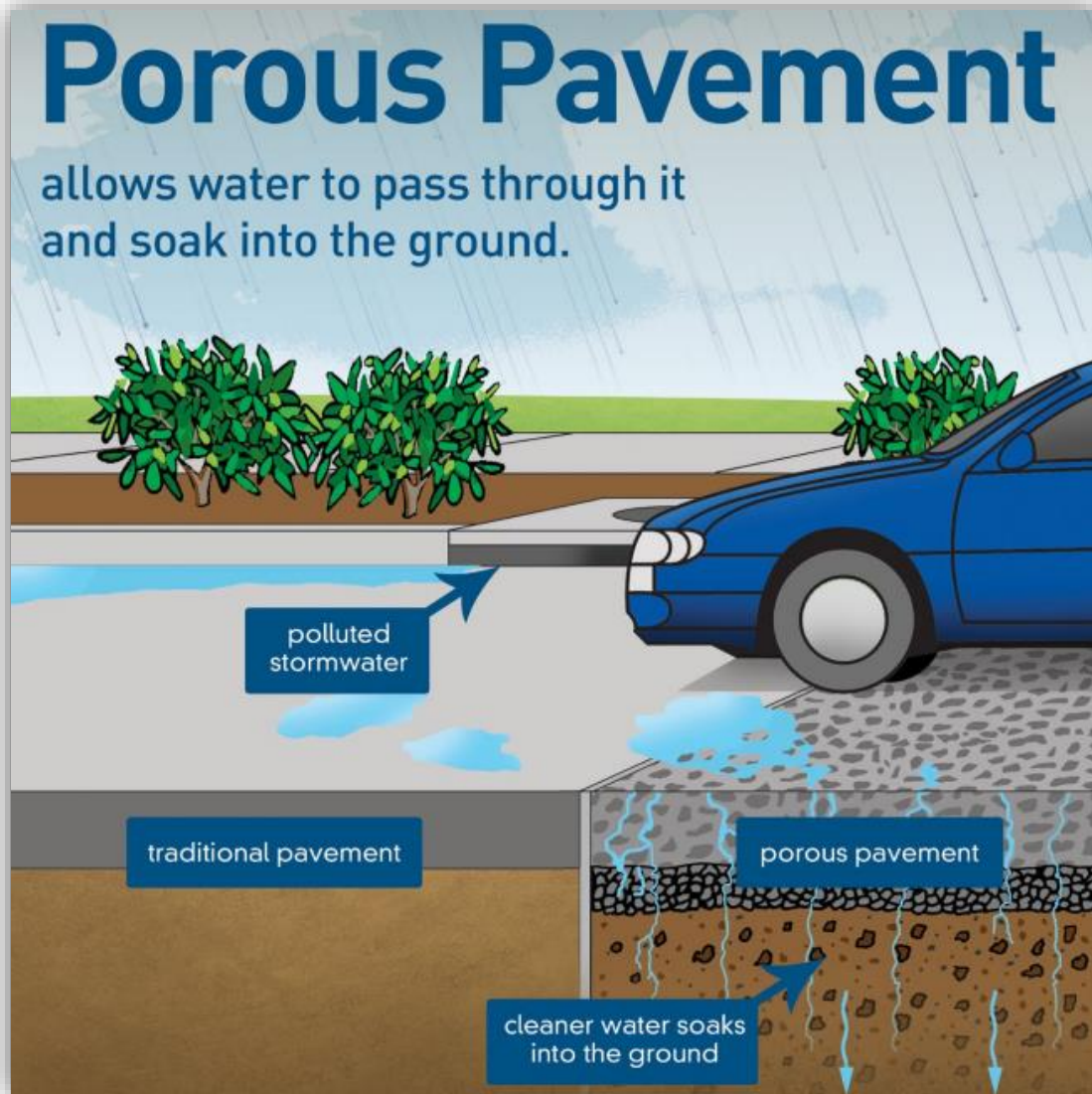
SWM Tools at Schools



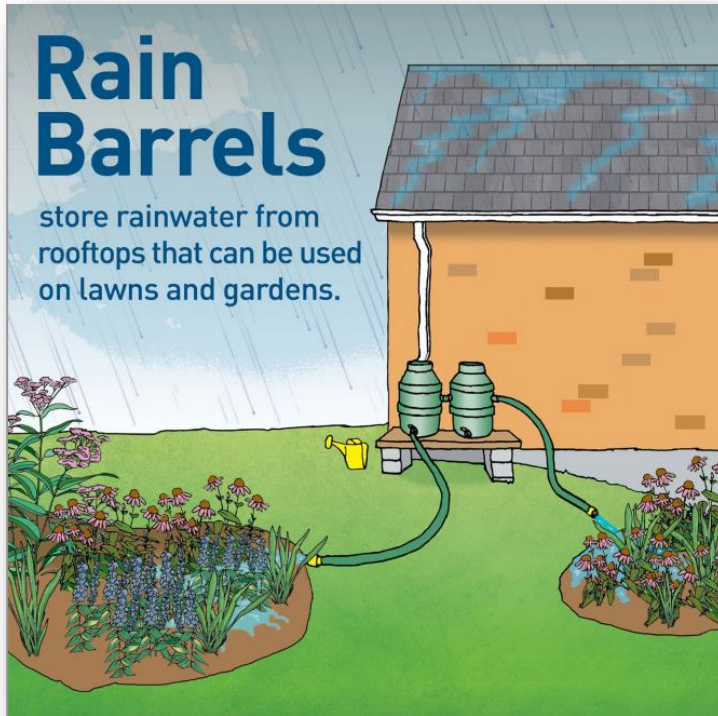
SWM Tools at Schools



SWM Tools at Schools



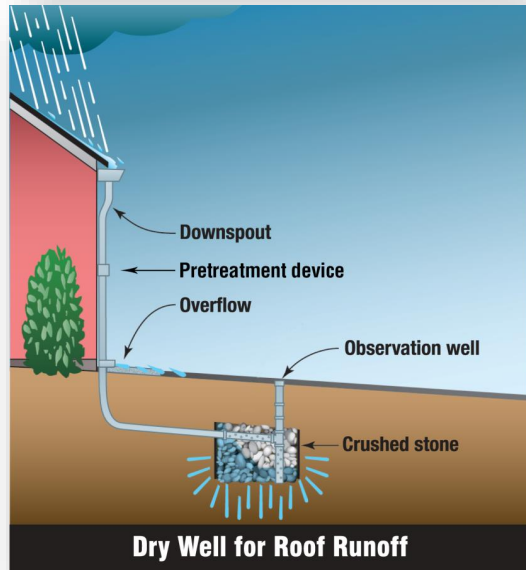
SWM Tools at Home – Water harvesting



Cistern



SWM Tools at Home



Green Roof

SWM Tools at Home



Conservation
Landscape



Rain Garden or Planter Box

Many projects can be done at home

You are standing next to a RainScape!

This RainScape is part of a network of environmental landscapes created at homes, businesses and congregations across Montgomery County. **The goal of these projects is to reduce stormwater runoff and improve the water quality of our streams.**

Plants used in RainScapes projects soak up the water, attract pollinators, and add beauty to properties. **The image below shows six common types of RainScapes.**

Build a RainScape at home! Montgomery County's RainScapes program offers **cash rebates** for projects. Visit [RainScapes.org](https://www.rainscapes.org) or call 311.

Beautiful landscapes for healthy watersheds

RainScapes

Montgomery County Department of Environmental Protection

The RainScapes Program has lots of information!

Interesting things can be observed in Stormwater management facilities!



What can you do?

- Plant trees/gardens
- Volunteer
- Scoop poop
- Recycle



Score your School Yard for you and the environment



RainScapes for Schools Environmental Report Card

How is your schoolyard doing? Is it helping the Chesapeake Bay, or is it contributing to the Bay's current impaired condition? Follow this Report Card and find out...

Runoff/Erosion:

1. Your school roof drains rainwater into mostly (choose one):
 - ☐ Well vegetated trees and shrubs or un-mowed grass (10 pts)
 - ☐ Mowed grass (3 pts)
 - ☐ Bare soil or impervious surface (3 pts)
 - ☐ Directly into storm drain (0 pts)
 - ☐ An even mix of all of the above (6 pts)
2. Look for patches of bare soil and signs of erosion such as areas where rainwater has carved out ditches or washed out vegetation. The schoolyard has (choose one):
 - ☐ Very little erosion and few patches of bare soil (10 pts)
 - ☐ Several patches of bare soil or areas where soil is eroding (7 pts)
 - ☐ Mostly bare, exposed soil or impervious surfaces (0 pts)
3. Does your school have any of these run-off control systems (choose all that apply):
 - ☐ Rain Garden (3 pts)
 - ☐ 10 or more Canopy Trees providing cover to rooftops or roadways (2 pts)
 - ☐ Conservation Landscape (2 pts)
 - ☐ 50 feet or more of a forested buffer zone (3 pts)
4. After looking at your schoolyard map, describe where in this range it falls.

1 2 3 4 5 6 7 8 9 10
 (1 = Entirely made of pavement) (10 = Totally forested)

Your Score

1. _____

2. _____

3. _____

4. _____

Runoff/
Erosion Total:

(out of 40)

Excess runoff will affect these indicators of Bay health:



Plant a Tree for the Environment and you



Trees:

1. Keep our local waterways clean and cool
2. Create habitat, shelter, and food for animals
3. Produce oxygen
4. Increase plant diversity
5. Create shade and a nice place to sit under

Take what you learned at school and Install a RainScape at home:



Pine Crest Elementary School



Rockville High School

Volunteer!

Fish and Aquatic Insect Monitoring





Volunteer Opportunities at DEP



- Stream Stewards
- FrogWatch
- Caching the Rain Geocache Trail



We ALL Need Clean Water!



Turtle hatchling



Northern Green Frog



Spotted Salamander



Great Blue Heron

Spread the word!

Unless someone
like you cares a
whole awful lot
nothing is going
to get better.
it's not.

■ dr. seuss

